Final
Site-Specific Field Sampling Plan, Site-Specific Safety and Health Plan, and Site-Specific Unexploded Ordnance Safety Plan Attachments Range, Choccolocco Corridor, Parcel 143Q Fort McClellan, Calhoun County, Alabama

Task Order CK10
Contract No. DACA21-96-D-0018
IT Project No. 796887

April 2002

Final
Site-Specific Field Sampling Plan Attachment
Range, Choccolocco Corridor, Parcel 143Q
Fort McClellan, Calhoun County, Alabama

Prepared for:

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Revision 0

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Executive Summary

In accordance with Contract Number DACA21-96-D-0018, Task Order CK10, IT Corporation (IT) will conduct site investigation activities at the Range, Choccolocco Corridor, Parcel 143Q, at Fort McClellan, Calhoun County, Alabama, to determine the presence or absence of potential site-specific chemicals at this site. The purpose of this site-specific field sampling plan (SFSP) is to provide technical guidance for sampling activities at Parcel 143Q.

Parcel 143Q consists of 33 acres and is located near the northern boundary of the Choccolocco Corridor, east of the Main Post. The parcel has been described as a presumed small arms range. Based on a site visit, by IT in October 2001, this area appears to have been used for training. Four surface features were identified during the site walk. A large north-south trending mound was observed in the central portion of the parcel. This mound was approximately 100 feet long and contained railroad cross ties in the center of the mound. A second mound was also found in the central portion of the parcel. The second mound trends east-west and was approximately 75 feet long. Three foxholes were identified south of the second mound at the base of the hill that is located just west of the parcel boundary. A set of foxholes was also found on the east side of the same hill. These foxholes are outside the Parcel 143Q boundary, but a gravel lined path was found leading to the foxholes from the parcel. An additional site walk in January 2002 identified small arms casings (blanks) on one of the unimproved roads near the center of the parcel.

Specifically, IT will collect 11 surface soil samples, 8 subsurface soil samples, and 2 groundwater samples. Potential contaminant sources at Parcel 143Q are primarily lead and explosives. Samples collected during the site investigation (SI) will be analyzed for metals and nitroaromatic/nitramine explosives. Approximately ten percent of the sample types will also be analyzed for volatile organic compounds, semivolatile organic compounds, chlorinated and organophosphorus pesticides, and chlorinated herbicides. Results from these analyses will be compared with site-specific screening levels, ecological screening values, and background values to determine if potential site-specific chemicals are present at the site at concentrations that pose an unacceptable risk to human health or the environment.

The presence of unexploded ordnance (UXO) is possible at Parcel 143Q because it is presumed to have been used for military training. Therefore, IT will conduct UXO avoidance activities as outlined in Appendix E of the installation-wide sampling and analysis plan (SAP) and the attached site-specific UXO safety plan prior to initiating field activities at Parcel 143Q. The

surface sweeps and downhole surveys will be conducted to identify anomalies for the purpose of UXO avoidance.

This SFSP attachment to the SAP for Parcel 143Q, will be used in conjunction with the site-specific safety and health plan, the site-specific UXO safety plan, the installation-wide work plan, and the SAP. The SAP includes the installation-wide safety and health plan, monitoring well installation and maintenance plan, waste management plan, ordnance and explosives management plan, and quality assurance plan. Site-specific hazard analyses are included in the site-specific safety and health plan.

1.0 Project Description

1.1 Introduction

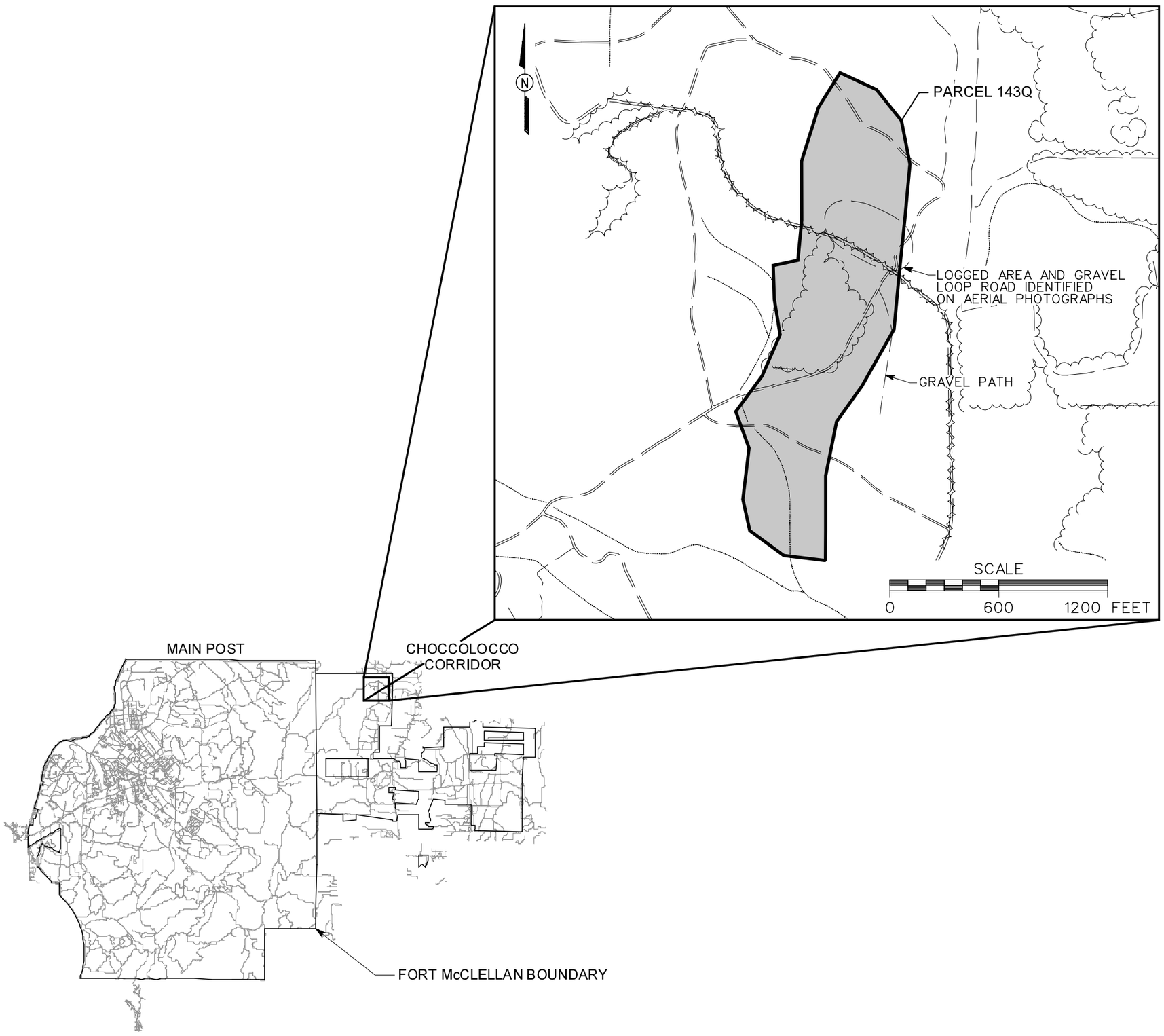
The U.S. Army is conducting studies of the environmental impact of suspected contaminants at Fort McClellan (FTMC) in Calhoun County, Alabama, under the management of the U.S. Army Corps of Engineers (USACE)-Mobile District. The USACE has contracted IT Corporation (IT) to provide environmental services for the site investigation (SI) at the Range, Choccolocco Corridor, Parcel 143Q, under Task Order CK10, Contract Number DACA21-96-D-0018.

This site-specific field sampling plan (SFSP) is an attachment to the installation-wide sampling and analysis plan (SAP) for FTMC (IT, 2002a) and has been prepared to provide technical guidance for sample collection and analysis at Parcel 143Q. This SFSP will be used in conjunction with the site-specific safety and health plan (SSHP) and site-specific unexploded ordnance (UXO) safety plan developed for Parcel 143Q, and the installation-wide work plan (WP) (IT, 2002b) and SAP. The SAP includes the installation-wide safety and health plan, waste management plan, ordnance and explosives management plan, and quality assurance plan (QAP). Site-specific hazard analyses are included in the SSHP.

1.2 Site Description

Parcel 143Q consists of 33 acres is located near the northeastern boundary of Choccolocco Corridor, east of the Main Post (Figures 1-1 and 1-2). Parcel 143Q was originally identified by the U.S. Environmental Protection Agency (EPA) Environmental Photographic Interpretation Center (EPIC) (EPA, 1990) in Choccolocco Corridor (Environmental Science and Engineering, Inc. [ESE], 1998). This range appears to be active in EPIC aerial photograph composites dated 1949, 1954, and 1972 (the 1961 photograph composite of Choccolocco Corridor was not included in the EPIC report). However, further review of aerial photographs from 1937 indicates that an area correlating to the dimensions of Parcel 149Q is present prior to Army use of Choccolocco Corridor. The FTMC lease of Choccolocco Corridor began in 1941 and was terminated in 1998. Parcel 143Q is presumed to have been small arms ranges from interviews that were conducted and because of the apparent absence of cratered impact areas (ESE, 1998).

Parcel 143Q, as identified by EPIC, is located in the vicinity of the Range 40 Complex (Parcels 94Q, 95Q, 96Q, and 97Q) which have previously been identified from maps. The orientation of Parcel 143Q suggests that the direction of fire was to the north. It is unlikely that the direction of



LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- TREES / TREELINE
- PARCEL BOUNDARY
- SURFACE DRAINAGE / CREEK
- BERM

FIGURE 1-1
SITE LOCATION MAP
RANGE, CHOCCOLOCCO CORRIDOR
PARCEL 143Q

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

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ENGR. CHCK. BY: S. MORAN
INITIATOR: D. ALLAN
PROJ. MGR.: J. YACOUB
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PROJ. NO.: 796887
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N 1,179,200

E 694,300

E 697,300

N 1,176,900

PARCEL 143Q

FLOW

FLOW

FLOW

FLOW

FLOW

1

2

3

4

LOGGED AREA AND GRAVEL LOOP ROAD IDENTIFIED ON AERIAL PHOTOGRAPHS

GRAVEL PATH

LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- SURFACE DRAINAGE / CREEK
- BERM

SCALE

0 300 600 FEET

TRAINING AIDS/PHYSICAL FEATURES OBSERVED

1. MOUND WITH HALF BURIED CROSS TIES
2. MOUND
3. POSSIBLE FOXHOLES
4. SMALL ARMS CASINGS FOUND ON ROAD

FIGURE 1-2
SITE MAP
RANGE, CHOCCOLOCCO CORRIDOR
PARCEL 143Q

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

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fire would have been to the south because firing lines for the other ranges would have been in the line of fire.

There are not any other areas or range fans that extend into this parcel. The four ranges immediately south of this parcel were used during the Vietnam War era and were abandoned in 1974.

Based on a site visit, by IT in October 2001, this area appears to have been used for training activities. Four surface features were identified during the site walk. A large north-south trending mound was observed in the central portion of the parcel. This mound was approximately 100 feet long and contained railroad cross ties in the center of the mound. A second mound was also found in the central portion of the parcel. The second mound trends east-west and was approximately 75 feet long. Three foxholes were identified south of the second mound at the base of the hill that is located just east of the parcel boundary. A set of foxholes was also found on the east side of the same hill. These foxholes are outside the Parcel 143Q boundary, but a gravel lined path was found leading to the foxholes from the parcel. An additional site walk in January 2002 identified small arms casings on one of the unimproved roads.

1.2.1 Archive Search Report Ranges

Range Plates 1 through 10 from the *Archives Search Report, Maps, Fort McClellan, Anniston, Alabama* (ASR) (USACE, 1999a) do not show any ranges in the areas of Parcel 143Q. However, Photo Plate 4 (1954), Photo Plate 5 (1961), and Photo Plate 6 (1969) from the ASR show gravel roads and clearings in and near the parcel. The most developed features appear in the 1961 aerial photograph and include a well defined gravel road and three barren areas. Also slightly evident in the 1961 photograph are narrow parallel barren areas oriented in a northwest-southeast direction that may indicate shooting lanes, trenching, or a similar feature.

1.2.2 Aerial Photographs

Available aerial photographs from FTMC were reviewed to reveal any land-use activity at the Parcel 143Q area. The following paragraphs summarize the review of aerial photographs for the years 1937, 1940, 1954, 1969, 1976, 1982, 1994, and 1998.

1937 and 1940. The 1937 aerial photograph shows that the majority of Parcel 143Q was cleared and presumed to be used for farming (cultivation). This cleared area essentially defines

the shape of Parcel 143Q. There were not any well-defined roads evident in the 1937 aerial photograph. The 1940 aerial photograph (Figure 1-3) is very similar to the 1937 aerial photograph. The area is still undeveloped with some erosional features evident after cultivation of the area ceased.

1954. The 1954 aerial photograph indicates that the cultivation in the area of Parcel 143Q is not occurring at this time. It also shows the development of dirt/gravel roads and one cleared/barren area with a small loop road (Figure 1-4). The majority of the area remains clear of vegetation and a few trees are apparently reclaiming the areas previously cultivated.

1969. The 1969 aerial photograph shows that parts of the area were basically abandoned as the cleared area and gravel loop road have been overgrown and the tree cover is much heavier than in 1954 (Figure 1-5). The gravel road through the area appears to have been well used.

1976, 1982, and 1994. These three photographs are very similar to the 1969 photograph and illustrate that the tree cover is increasing over time. The gravel roads shown in earlier photographs are also becoming less visible due to overgrowth of tree cover, which may indicate little use of most of the area. In the 1994 photograph, it appears that an area of several acres has been cleared in the east-central portion of the parcel.

1998. The 1998 photograph shows the same trend as the previous four photographs, increasing tree and brush cover (Figure 1-6). The gravel road is less visible and the barren area and loop road first seen in the 1954 photograph now appear completely overgrown with heavy tree cover. The cleared area in the east-central portion of the parcel is still visible.

The elevation of the site ranges from approximately 775 feet above mean sea level (msl) at the southern end of the site to approximately 900 feet msl in the northern portion of the site. Surface runoff drains toward the east/southeast across the site. The local shallow groundwater flow direction is probably controlled by topography; therefore, groundwater flow in the residuum is likely to the east/southeast.

Soils at Parcel 143Q fall mainly into three soil series, the Anniston gravelly clay loam, the Anniston and Allen gravelly loam, and the Philo and Stendal local alluvium (U.S. Department of Agriculture [USDA], 1961). The Anniston and Allen Series of soils consists of strongly acid, deep, well-drained soils that have developed in old local alluvium. The parent material washed from the adjacent higher-lying Linker, Muskingum, Enders, and Montevallo soils, which

693900 694800 695700 696600 697500

1179000

1178100

1177200

143Q

This map employs uncontrolled aerial photographs. The resulting distortions affect the spatial accuracy of the photographs.

N:\\projectskeep\projects\ftmc\gisworkarea\jbond\apr\range_work_plans.apr\143Q_1940

Figure 1-3

1940 Aerial Photograph

Range, Choccolocco Corridor, Parcel 143Q
Fort McClellan, AL

Legend

Area of Investigation/ Parcel Boundary

0 300 Feet

NAD83 State Plane Coordinates

N

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693900 694800 695700 696600 697500

1179000

1178100

1177200

143Q

1954 aerial coverage unavailable for this area.

This map employs uncontrolled aerial photographs. The resulting distortions affect the spatial accuracy of the photographs.

N:\\projectskeep\projects\ftmc\gisworkarea\jbond\apr\range_work_plans.apr\143Q_1954

693900 694800 695700 696600 697500

Figure 1-4

1954 Aerial Photograph

Range, Choccolocco Corridor, Parcel 143Q
Fort McClellan, AL

Legend

Area of Investigation/ Parcel Boundary

0 300 Feet

NAD83 State Plane Coordinates

N

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143Q

1969 aerial coverage unavailable for this area.

This map employs uncontrolled aerial photographs. The resulting distortions affect the spatial accuracy of the photographs.

N:\\projectskeep\projects\ftmc\gisworkarea\jbond\apr\range_work_plans.apr\143Q_1969

Figure 1-5

1969 Aerial Photograph

Range, Choccolocco Corridor, Parcel 143Q
Fort McClellan, AL

Legend

Area of Investigation/ Parcel Boundary

0 300 Feet

NAD83 State Plane Coordinates

N

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143Q

This map employs uncontrolled aerial photographs. The resulting distortions affect the spatial accuracy of the photographs.

N:\projectskeep\projects\ftmc\gisworkarea\lbond\apr\range_work_plans.apr\143Q_1998

Figure 1-6

1998 Aerial Photograph

Range, Choccolocco Corridor, Parcel 143Q
Fort McClellan, AL

Legend

Area of Investigation/ Parcel Boundary

0 300 Feet

NAD83 State Plane Coordinates

N

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developed from weathered sandstone, shale, and quartzite. These sites contain sandstone and quartzite gravel and cobbles, which measure as much as 8 inches in diameter on the surface and throughout the soil. For this soil series, the depth to bedrock is typically from 2 feet to greater than 10 feet, with depth to water greater than 20 feet (USDA, 1961).

The Anniston gravelly clay loam soils are mainly mapped along the western half of the parcel. Two Anniston series soils are mapped in this area, AbC3 (6 to 10 percent slopes, eroded) and AbD3 (10 to15 percent slopes, eroded). The Anniston series consists of areas that were formerly Anniston or Allen gravelly loams that have lost nearly all their original surface soil through erosion. The soil consists of a reddish-brown gravelly clay loam underlain by a red or dark reddish-brown gravelly clay loam. Many shallow and a few deep gullies are in these mapping units.

The southeastern portion of the parcel consists of the Anniston and Allen gravelly loams, 2 to 6 percent slopes (AcB2) and 15 to 25 percent slopes (AcE2). These series consist of friable soils that have developed in old alluvium on foot slopes and fans along the bases of the mountains. Some severely eroded areas may be common on the surface for this soil type as well as a few shallow gullies. Generally, the depth to bedrock ranges from 2 feet to greater than 10 feet. The typical soil description is 2 to 10 feet of well-drained stony loam to clay loam over stratified local alluvium; limestone or shale bedrock. The depth to the water table is likely greater than 20 feet.

The third series of soils found is the Philo and Stendal Series of soils (USDA, 1961). The Philo and Stendal series consists of strongly acid, moderately well-drained soils that are developing in local and general alluvium. The parent material washed mainly from sandstone and shale, but some of it originated from limestone. Philo soils occur on first bottoms along most streams in the northern part of Calhoun County. The surface soil is very dark grayish-brown to dark-brown fine sandy loam, and the subsoil is dark-brown, slightly mottled fine sandy loam. Soils that fall into the Philo and Stendal soils local alluvium, 0 to 2 percent slopes (PkA) are found only along the intermittent streams that flows northeast off site (USDA, 1961). This mapping unit is on foot slopes along and at the heads of small drainages or draws (the northern and southern ends of the parcel).

1.3 Scope of Work

The scope of work for SI field activities at Parcel 143Q, as specified by the statement of work (USACE, 1999b), includes the following tasks:

- Develop the SFSP attachment.
- Develop the SSHP attachment.
- Develop the UXO safety plan attachment.
- Conduct a surface and near-surface UXO survey over all areas to be included in the sampling effort.
- Provide downhole UXO support for all intrusive drilling to determine buried downhole hazards.
- Collect 11 surface soil samples, 8 subsurface soil samples, and 2 groundwater samples to determine whether potential site-specific chemicals (PSSC) are present at the site and to provide data useful for supporting any future corrective measures and closure activities.
- Analyze samples for the parameters listed in Section 4.5.

The possibility for UXO exists at this site because the area is presumed to have been used for military training; therefore, UXO surface sweeps and downhole surveys of soil borings will be required to support field activities at this site. The surface sweeps and downhole surveys will be conducted to identify anomalies for the purposes of UXO avoidance. The site-specific UXO safety plan attachment addresses the manner in which the avoidance will be conducted.

Following the field activities and sample analyses, an SI summary report will be prepared to evaluate the absence or presence of PSSCs at this site and to recommend further actions, if appropriate. The SI summary report will be prepared in accordance with current U.S. Environmental Protection Agency (EPA), Region IV, and Alabama Department of Environmental Management (ADEM) guidelines.

2.0 Summary of Existing Environmental Studies

An environmental baseline survey (EBS) was conducted by ESE to document current environmental conditions of all FTMC property (ESE, 1998). The study was to identify sites that, based on available information, have no history of contamination and comply with U.S. Department of Defense guidance for fast-track cleanup at closing installations. The EBS also provides a baseline picture of FTMC properties by identifying and categorizing the properties by the following seven criteria:

1. Areas where no storage, release, or disposal of hazardous substance or petroleum products has occurred (including no migration of these substances from adjacent areas)

2. Areas where only release or disposal of petroleum products has occurred

3. Areas where release, disposal, and/or migration of hazardous substance has occurred, but at concentrations that do not require a removal or remedial response

4. Areas where release, disposal, and/or migration of hazardous substance has occurred, and all removal or remedial actions to protect human health and the environment have been taken

5. Areas where release, disposal, and/or migration of hazardous substance has occurred, and removal or remedial actions are underway, but all required remedial actions have not yet been taken

6. Areas where release, disposal, and/or migration of hazardous substance has occurred, but required actions have not yet been implemented

7. Areas that are not evaluated or require further evaluation.

For non-Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) environmental or safety issues, the parcel label includes the following components: a unique non-CERCLA issue number, the letter "Q" designating the parcel as a Community Environmental Response Facilitation Act (CERFA) Category 1 Qualified Parcel, and the code for the specific non-CERCLA issue(s) present (ESE, 1998). The non-CERCLA issue codes used are:

- A = Asbestos (in buildings)
- L = Lead-based paint (in buildings)

- P = Polychlorinated biphenyls
- R = Radon (in buildings)
- RD = Radionuclides/radiological issues
- X = UXO
- CWM = Chemical warfare material.

The EBS was conducted in accordance with the CERFA protocols (CERFA-Public Law 102-426) and U.S. Department of Defense policy regarding contamination assessment. Record searches and reviews were performed on all reasonably available documents from FTMC, ADEM, EPA Region IV, and Calhoun County, as well as a database search of CERCLA-regulated substances, petroleum products, and Resource Conservation and Recovery Act-regulated facilities. Available historical maps and aerial photographs were reviewed to document historical land uses. Personal and telephone interviews of past and present FTMC employees and military personnel were conducted. In addition, visual site inspections were conducted to verify conditions of specific property parcels.

The Range, Choccolocco Corridor, Parcel 143Q was identified as a Category 1 CERFA site. This Category 1 CERFA site is a parcel where no known or recorded storage, release, or disposal (including migration) has occurred on site property but is qualified ("Q") because the site was a former active range. Parcel 143Q requires additional evaluation to determine the environmental condition of the parcel.

3.0 Site-Specific Data Quality Objectives

3.1 Overview

The data quality objective (DQO) process is followed to establish data requirements. This process ensures that the proper quantity and quality of data are generated to support the decision-making process associated with the action selection for Parcel 143Q. This section incorporates the components of the DQO process described in the publication EPA 600/R-96/005 *Guidance for the Data Quality Objectives Process* (EPA, 2000). The DQO process as applied to Parcel 143Q is described in more detail in Section 3.4 of this SFSP. Table 3-1 provides a summary of the factors used to determine the appropriate quantity of samples and the procedures necessary to meet the objectives of the SI and establish a basis for future action at this site.

The samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Chapter 4.0 in this SFSP and Section 5.0 in the QAP (IT, 2002b). Data will be reported in accordance with definitive data requirements of the USACE Engineer Manual, *Chemical Quality Assurance For Hazardous, Toxic And Radioactive Waste (HTRW) Projects* (USACE, 1997) and evaluated by the stipulated requirements for the generation of definitive data (Section 7.2.2 of the QAP). Chemical data will be reported by the laboratory via hard-copy data packages using Contract Laboratory Program-like forms, along with electronic copies. These packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

3.2 Data Users and Available Data

The available data related to the SI at Parcel 143Q presented in Table 3-1, have been used to formulate a site-specific conceptual model. This conceptual model was developed to support the development of this SFSP, which is necessary to meet the objectives of these activities and to establish a basis for future action at the site. The data users for the data and information generated during field activities are primarily EPA, USACE, ADEM, FTMC, and other USACE supporting contractors. This SFSP, along with the necessary companion documents, has been designed to provide the regulatory agencies with sufficient detail to reach a determination as to the adequacy of the scope of work. The program has also been designed to provide the level of defensible data and information required to confirm or rule out the existence of residual chemical contamination in site media.

Table 3-1

Summary of Data Quality Objectives
Range, Choccolocco Corridor, Parcel 143Q
Fort McClellan, Calhoun County, Alabama

Users	Available Data	Conceptual Site Model	Media of Concern	Data Uses and Objectives	Data Types	Analytical Level	Data Quantity
EPA, ADEM USACE, DOD FTMC, IT Corporation Other contractors, and possible future land users	None	Contaminant Source Parcel 143Q (explosives and metals) Migration Pathways Infiltration and leaching to subsurface soil and groundwater, biotransfer to venison, dust emissions and volatilization to ambient air. Potential Receptors Recreational site user (current and future), resident (future). PSSC metals, nitroexplosives, VOCs, SVOCs, herbicides, and pesticides	Surface soil Subsurface Soil Groundwater	SI to confirm the presence or absence of contamination in the site media Definitive quality data for future decision-making	Surface soil TAL Metals, Nitroaromatic and Nitramine Explosives; Plus 10% of Sample Types for TCL VOCs TCL SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides	Definitive data (as defined in USACE EM 200-1-6) in data packages	11 surface soil samples + QC
					Subsurface Soil TAL Metals, Nitroaromatic and Nitramine Explosives; Plus 10% of Sample Types for TCL VOCs TCL SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides	Definitive data (as defined in USACE EM 200-1-6) in data packages	8 subsurface soil samples + QC
					Groundwater TAL Metals, Nitroaromatic and Nitramine Explosives; Plus 10% of Sample Types for TCL VOCs TCL SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides	Definitive data (as defined in USACE EM 200-1-6) in data packages	2 groundwater samples + QC

EM 200-1-6 - USACE Engineer Manual, *Chemical Quality Assurance for HTRW Projects*, October 10, 1997.

ADEM - Alabama Department of Environmental Management.
CI - Chlorinated.
DOD - U.S. Department of Defense.
EPA - U.S. Environmental Protection Agency.
FTMC - Fort McClellan.
OP - Organophosphorus.
PSSC - Potential site-specific chemical.
QC - Quality control.
SI - Site investigation.
SVOC - Semi-volatile Organic Compounds.
TAL - Target analyte list.
TCL - Target compound list.
TOC - Total organic carbon.
USACE - U.S. Army Corps of Engineers.
VOC - Volatile Organic Compounds.

3.3 Conceptual Site Exposure Model

The conceptual site exposure model (CSEM) provides the basis for identifying and evaluating potential risks to human health in the risk assessment. The CSEM includes all receptors and potential exposure pathways appropriate to all plausible scenarios. The CSEM facilitates consistent and comprehensive evaluation of risk to human health through graphically presenting all possible exposure pathways, including all sources, release and transport pathways, and exposure routes. In addition, the CSEM helps to ensure that potential pathways are not overlooked. The elements of a complete exposure pathway and CSEM are:

- Source (i.e., contaminated environmental) media
- Contaminant release mechanisms
- Contaminant transport pathways
- Receptors
- Exposure pathways.

Contaminant release mechanisms and transport pathways are not relevant for direct receptor contact scenarios with a contaminated source medium.

The site may have been used for small arms training. Therefore, primary contaminant releases were probably limited to lead, or other constituents that entered surface and possibly subsurface soil via bullets, shells, etc. Natural weathering of the spent ammunition could lead to other potential contaminant transport pathways including leaching to subsurface soil and groundwater, dust emissions and volatilization to ambient air, and biotransfer to deer through browsing.

Parcel 143Q is mostly covered with trees, and is currently not used by base personnel. However, because the site is not fenced and is wooded, it is accessible to potential trespassers and may be used for hunting purposes. Therefore, the only plausible receptor evaluated under the current land-use scenario is the recreational site user who hunts. Potential receptor scenarios considered, but not included under current land-use scenarios, are as follows:

Groundskeeper. The site is not currently maintained by a groundskeeper.

Construction Worker. The site is unused, and no development or construction is occurring.

Resident. The site is not currently used for residential purposes.

Future land use for Parcel 143Q is shown as part of the remediation reserve to be used for passive recreation, although the site may not be deemed safe for public access until remediation has been completed due to the potential for UXO (FTMC, 1997). Potential receptor scenarios evaluated for the future include the following:

Recreational Site User. Because the future site is planned for passive recreational use, and hunting is a viable option, the recreational site user is included. Fish ingestion will not be evaluated since no surface water is present.

Resident. Although the site is not expected to be utilized for residential purposes, the resident is considered in order to provide information for the project manager and regulators.

A summary of relevant contaminant release and transport mechanisms, source and exposure media, and receptors and exposure pathways for this site are provided in Table 3-1 and Figure 3-1.

3.4 Decision-Making Process, Data Uses, and Needs

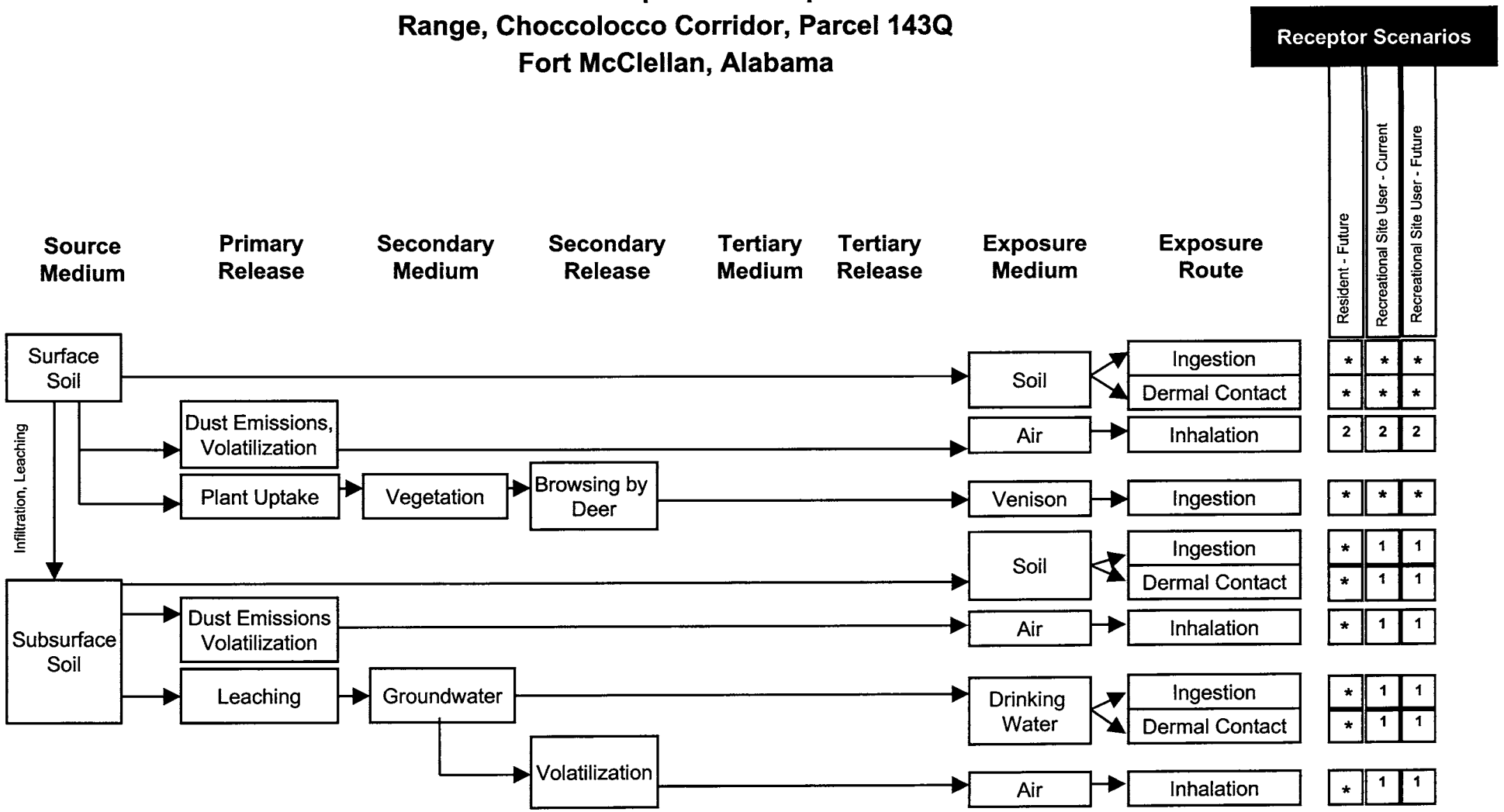
The seven-stage data quality decision-making process is presented in detail in Section 3.0 of the WP (IT, 2002b) and will be followed during the SI at Parcel 143Q. Data uses and needs are summarized in Table 3-1.

3.4.1 Risk Evaluation

Confirmation of contamination at Parcel 143Q will be based on using EPA definitive data to determine whether or not PSSCs are detected in site media. Detected site chemical concentrations will be compared to site-specific screening levels, ecological screening values, and background values to determine if PSSCs are present at the site at concentrations that pose an unacceptable risk to human health or the environment. Definitive data will be adequate for confirming the presence of site contamination and for supporting a feasibility study and risk assessment.

Assessment of potential ecological risk associated with sites or parcels (e.g., surface water and sediment sampling, specific ecological assessment methods, etc.) will be addressed in accordance with the procedures in Section 5.3 of the WP (IT, 2002b).

Figure 3-1
Human Health Conceptual Site Exposure Model
Range, Choccolocco Corridor, Parcel 143Q
Fort McClellan, Alabama



* = Complete exposure pathway evaluated in the streamlined risk assessment.
1 = Incomplete exposure pathway.
2 = Although theoretically complete, this pathway is judged to be insignificant and is not evaluated in the streamlined risk assessment.

3.4.2 Data Types and Quality

Surface soil, subsurface soil, and groundwater will be sampled and analyzed to meet the objectives of the SI at Parcel 143Q. Quality assurance/quality control (QA/QC) samples will be collected for all sample types as described in Chapter 4.0 of this SFSP. Samples will be analyzed by EPA-approved SW-846 Methods Update III, where available; comply with EPA definitive data requirements; and be reported using hard-copy data packages. In addition to meeting the quality needs of this SI, data analyzed at this level of quality are appropriate for all phases of site characterization, remedial investigation, and risk assessment.

3.4.3 Precision, Accuracy, and Completeness

Laboratory requirements of precision, accuracy, and completeness for this SI are defined in Section 3.3 and presented in Section 5.0 of the QAP (IT, 2002a).

4.0 Field Activities

4.1 UXO Survey Requirements and Utility Clearances

The Range, Choccolocco Corridor, Parcel 143Q, falls within the area of former active ranges; therefore, IT will conduct UXO avoidance activities, including surface sweeps and downhole surveys of soil borings. The site-specific UXO safety work plan provides technical guidance for ordnance and explosives avoidance and construction activities for sample collection activities at Parcel 143Q. The site-specific UXO safety work plan attachment has been written in conjunction with Appendix E of the SAP (IT, 2002a).

4.1.1 Surface UXO Survey

A UXO sweep will be conducted over areas that will be included in the sampling and surveying activities to identify UXO on or near the surface that may present a hazard to on-site workers during field activities. Low-sensitivity magnetometers will be used to locate surface and shallow-buried metal objects. UXO located on the surface will be identified and conspicuously marked for easy avoidance. Subsurface metallic anomalies will not be disturbed and will also be marked for easy avoidance. UXO personnel requirements, procedures, and detailed descriptions of the geophysical equipment to be used are provided in Appendix E of the approved SAP (IT, 2002a).

4.1.2 Downhole UXO Survey

During the soil boring and downhole sampling, downhole UXO surveys will be performed to determine if buried metallic objects are present. UXO monitoring, as described in Appendix E of the SAP (IT, 2002a), will continue until undisturbed soil is encountered or the borehole has been advanced to 12 feet below ground surface, whichever is reached first.

4.1.3 Utility Clearances

After the UXO surface survey has cleared the area to be sampled and prior to performing any intrusive sampling, a utility clearance will be performed at locations where soil and groundwater samples will be collected, using the procedure outlined in Section 4.2 of the SAP (IT, 2002a). The site manager will mark the proposed locations with stakes, coordinate with the local utility companies to clear the proposed locations for utilities, and obtain digging permits. Once the locations are approved (for both UXO and utility avoidance) for intrusive sampling, the stakes will be labeled as cleared.

4.2 Environmental Sampling

The environmental sampling program at Parcel 143Q includes the collection of surface soil, subsurface soil, and groundwater samples for chemical analysis. These samples will be collected and analyzed to provide data for characterizing the site to determine the environmental condition of the site and any further action to be conducted at the site. Additionally, samples will be collected from environmental media in locations that will assist in the assessment of potential ecological impacts resulting from activities at the site.

4.2.1 Surface Soil Sampling

Surface soil samples will be collected from 11 boring locations at Parcel 143Q.

4.2.1.1 Sample Locations and Rationale

The sampling rationale for each surface soil sample location is listed in Table 4-1. Proposed sampling locations are shown in Figure 4-1. Surface soil sample designations and required QA/QC sample requirements are summarized in Table 4-2. The final soil boring sampling locations will be determined in the field by the on-site geologist, based on actual field conditions.

4.2.1.2 Sample Collection

Surface soil samples will be collected from the upper 1 foot of soil by direct-push methodology as specified in Section 5.1.1.1 and Section 6.1.1.1 of the SAP (IT, 2002a). In areas where site access does not permit the use of a direct-push rig, the samples will be collected using a stainless steel hand auger as specified in Section 5.1.1.2 and Section 6.1.1.1 of the SAP. Collected soil samples will be screened using a photoionization detector (PID) in accordance with Section 6.8.3 of the SAP. Surface soil samples will be screened for information purposes only and not to select samples for analysis. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are discussed in Section 4.0 and listed in Table 4-1, of the QAP. Sample documentation and chain-of-custody (COC) will be recorded as specified in Section 6.0 of the SAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.2 Subsurface Soil Sampling

Subsurface soil samples will be collected from 8 boring locations at Parcel 143Q.

Table 4-1

Sampling Locations and Rationale
Range, Choccolocco Corridor, Parcel 143Q
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Sample Location Rationale
HR-143Q-GP01	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the northern portion of the parcel. This sample location is north of the approximate location of the logged areas and the loop road identified on the aerial photos. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
HR-143Q-GP02	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the northern portion of the parcel. This sample location is in the approximate location of the logged areas and the loop road identified on the aerial photos. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
HR-143Q-GP03	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the northern portion of the parcel. This sample location is in the approximate location of the logged areas and the loop road identified on the aerial photos. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
HR-143Q-GP04	Surface soil	Surface soil sample to be placed in the central portion of the parcel. This sample location is on the north-south trending mounds identified during the IT site visit. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
HR-143Q-GP05	Surface soil	Surface soil sample to be placed in the central portion of the parcel. This sample location is on the east-west trending mounds identified during the IT site visit. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
HR-143Q-GP06	Surface soil	Surface soil sample to be placed in the central portion of the parcel. This sample location is on the east-west trending berm identified during the IT site visit. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
HR-143Q-GP07	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the southern portion of the parcel. This sample location is downslope of the possible foxholes on the southeastern portion of the parcel identified during the IT site visit. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
HR-143Q-GP08	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the southern portion of the parcel. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
HR-143Q-GP09	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil to be placed along road where small arms casings were observed during the IT site walk. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
HR-143Q-MW01	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in the northern portion of the parcel. This sample location is on the downslope side of the approximate location of the logged areas and loop road identified on the aerial photos. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and location-specific geology, and provide information on groundwater quality in the residuum aquifer.
HR-143Q-MW02	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in the central portion of the parcel. This sample location is downslope of the east-west trending mounds identified during the IT site visit. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and location-specific geology, and provide information on groundwater quality in the residuum aquifer.

DWG. NO.: ...796887es.294 | PROJ. NO.: 796887
INITIATOR: D. ALLAN | PROJ. MGR.: J. YACOUB
DRAFT. CHCK. BY: | ENGR. CHCK. BY: S. MORAN
DATE LAST REV.: | DRAWN BY:
STARTING DATE: 01/08/02 | DRAWN BY: D. BOMAR
03/26/02 02:34:49 PM
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N 1,179,200

E 694,300

E 697,300

N 1,176,900

PARCEL 143Q

HR-143Q-GP01

HR-143Q-GP02

HR-143Q-GP03

HR-143Q-GP04

HR-143Q-GP05

HR-143Q-GP06

HR-143Q-GP07

HR-143Q-GP08

HR-143Q-GP09

HR-143Q-MW01

HR-143Q-MW02

FLOW

FLOW

FLOW

LOGGED AREA AND GRAVEL LOOP ROAD IDENTIFIED ON AERIAL PHOTOGRAPHS

GRAVEL PATH

LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- SURFACE DRAINAGE / CREEK
- BERM
- PROPOSED SURFACE SOIL SAMPLE LOCATION
- PROPOSED SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- PROPOSED GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION

TRAINING AIDS/PHYSICAL FEATURES OBSERVED

1. MOUND WITH HALF BURIED CROSS TIES
2. MOUND
3. POSSIBLE FOXHOLES
4. SMALL ARMS CASINGS FOUND ON ROAD

SCALE

0 300 600 FEET

FIGURE 4-1
PROPOSED SAMPLE LOCATION MAP RANGE, CHOCCOLOCCO CORRIDOR PARCEL 143Q

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

IT CORPORATION
A Member of The IT Group

Table 4-2

Surface Soil and Subsurface Soil Sample Designations and QA/QC Sample Quantities
Range, Choccolocco Corridor, Parcel 143Q
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)[a]	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	Matrix Spike / Matrix Spike Duplicate	
HR-143Q-GP01	HR-143Q-GP01-SS-QH0001-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-143Q-GP01-DS-QH0002-REG	2-4				
HR-143Q-GP02	HR-143Q-GP02-SS-QH0003-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-143Q-GP02-DS-QH0004-REG	2-4				
HR-143Q-GP03	HR-143Q-GP03-SS-QH0005-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-143Q-GP03-DS-QH0006-REG	2-4				
HR-143Q-GP04	HR-143Q-GP04-SS-QH0007-REG	0-1	HR-143Q-GP04-DS-QH0008-FD			TAL Metals, Nitroaromatic/Nitramine Explosives TCL VOCs, TCL SVOCs, Cl Pesticides, OP Pesticides, and Cl Herbicides
HR-143Q-GP05	HR-143Q-GP05-SS-QH009-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
HR-143Q-GP06	HR-143Q-GP06-SS-QH0010-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
HR-143Q-GP07	HR-143Q-GP07-SS-QH0011-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-143Q-GP07-DS-QH0012-REG	2-4				
HR-143Q-GP08	HR-143Q-GP08-SS-QH0013-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-143Q-GP08-DS-QH0014-REG	2-4				
HR-143Q-GP09	HR-143Q-GP09-SS-QH0015-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-143Q-GP09-DS-QH0016-REG	2-4				
HR-143Q-MW01	HR-143Q-MW01-SS-QH0017-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-143Q-MW01-DS-QH0018-REG	2-4				

Table 4-2

Surface Soil and Subsurface Soil Sample Designations and QA/QC Sample Quantities
Range, Choccolocco Corridor, Parcel 143Q
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)[a]	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	Matrix Spike / Matrix Spike Duplicate	
HR-143Q-MW02	HR-143Q-MW02-SS-QH0019-REG	0-1	HR-143Q-MW02-SS-QH0020-FD			TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-143Q-MW02-DS-QH0021-REG	2-4			HR-143Q-MW02-DS-QH0021-MS/MSD	

[a] Actual sample depth selected for analysis will be at the discretion of the site geologist and will be based on field observation.

FD - Field duplicate.
Cl - Chlorinated.
FS - Field split.
MS/MSD - Matrix spike/matrix spike duplicate.
OP - Organophosphate.
QA/QC - Quality assurance/quality control.
REG - Field sample.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
VOC - Volatile organic compound.

4.2.2.1 Sample Locations and Rationale

Subsurface soil samples will be collected from the soil borings proposed on Figure 4-1. The sampling rationale for each subsurface soil sample location is listed in Table 4-1. Subsurface soil samples to be collected are listed in Table 4-2. The final soil boring sampling locations will be determined in the field by the on-site geologist, based on actual field observations and utility clearance results.

4.2.2.2 Sample Collection

Subsurface soil samples will be collected from soil borings at a depth greater than one foot below ground surface in the unsaturated zone. The soil borings will be advanced and soil samples collected using the direct-push sampling procedures specified in Section 5.1.1.1 and Section 6.1.1.1 of the SAP (IT, 2002a). In areas where site access does not permit the use of a direct-push rig, the samples will be collected using a hand-auger as specified in Section 5.1.1.2 and Section 6.1.1.1 of the SAP.

Soil samples will be collected continuously for the first 4 feet or until either groundwater or refusal is reached. A detailed lithogical log will be recorded by the on-site geologist for each borehole. At least one subsurface sample from each borehole will be selected for analysis. The collected subsurface soil samples will be field-screened using a PID in accordance with Section 6.8.3 of the SAP to measure samples exhibiting elevated readings exceeding background (readings in ambient air). Typically, the subsurface soil sample showing the highest reading (above background) will be selected and sent to the laboratory for analysis. If none of the samples indicates a reading exceeding background using the PID, the deepest interval from the soil boring will be sampled and submitted to the laboratory for analysis. Subsurface soil samples will be selected for analysis from any depth interval if the on-site geologist suspects PSSCs at the interval. Site conditions such as lithology may also determine the actual sample depth interval submitted for analysis. The depth of the boring may be extended beyond four feet below ground surface (bgs) and more than one subsurface soil sample will be collected if field measurements and observations indicate a possible layer of PSSCs and/or additional sample data would provide insight to the existence of any PSSCs.

Sample documentation and COC will be recorded as specified in Section 6.0 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are discussed in Section 4.0, and listed in Table 4-1 of the QAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.3 Permanent Residuum Monitoring Wells

Two permanent residuum monitoring wells will be installed at Parcel 143Q. The permanent residuum monitoring well locations are shown on Figure 4-1. The rationale for each monitoring well location is presented in Table 4-1. The monitoring well boreholes will be drilled to the top of bedrock, or until adequate groundwater is encountered to install a well with a 10- to 20-foot screen. Monitoring wells will be installed using a truck-mounted hollow-stem auger drill rig. The monitoring well casing will consist of new 2-inch inside-diameter, Schedule 40, threaded, flush-joint polyvinyl chloride (PVC) pipe. Attached to the bottom of the well casing will be a section of new threaded, flush-joint, 0.010-inch continuous wrap PVC well screen, approximately 10 to 20 feet long.

At the discretion of the IT site manager, a sump (composed of new, 2-inch inside diameter [ID], schedule 40, threaded, flush-joint PVC) may be attached to the bottom of the well screen. After the casing and screen materials are lowered into the boring, a filter pack will be installed around the well screen. In wells installed to depths of 20 feet or less, the filter pack material will be gravity filled. In wells installed to depths of 20 feet or more, the filter pack will be tremied into place. The filter pack will be installed from the bottom of the well to approximately five feet above the top of the well screen. The filter pack will consist of 20/40 silica sand. A fine sand (30/70 silica sand), approximately five feet thick, may be placed above the filter pack. A bentonite seal, approximately five feet thick, will be placed above the filter pack (or fine sand, if used). The remaining annular space will be grouted with a bentonite-cement mixture, using approximately 7 to 8 gallons of water and approximately 5 pounds of bentonite per 94 pound bag of Type I or Type II Portland cement. The grout will be tremied into place from the top of the bentonite seal to ground surface. Monitoring wells will be completed with stick-up or flush-mount construction as determined by the site geologist based on site conditions.

Soil samples for lithology will be collected starting at 5 feet bgs and at five-foot intervals to the total depth of the hole during hollow-stem auger drilling to provide a detailed lithologic log. The samples will be collected for lithology using a 24-inch-long, 2-inch-or-larger-diameter split-spoon sampler. The soil borings will be logged in accordance with American Standard for Testing and Materials Method D 2488 using the Unified Soil Classification System. The soil samples will be screened in the field using a PID for potential volatile organic compounds. The monitoring wells will be drilled, installed, and developed as specified in Section 5.1 and

Appendix C of the SAP (IT, 2002a). The exact monitoring well locations will be determined in the field by the on-site geologist, based on actual field conditions.

4.2.4 Groundwater Sampling

Groundwater samples will be collected from the two monitoring wells completed at Parcel 143Q, as presented in Section 4.2.3.

4.2.4.1 Sample Locations and Rationale

Groundwater samples will be collected from the monitoring well locations shown on Figure 4-1. The groundwater sampling rationale is listed in Table 4-1. The groundwater sample designations, depths, and required QA/QC sample quantities are listed in Table 4-3.

4.2.4.2 Sample Collection

Prior to sampling monitoring wells, static water levels will be measured from each of the monitoring wells installed at the site to define the groundwater flow in the residuum aquifer. Water level measurements will be performed as outlined in Section 5.5 of the SAP (IT, 2002a). Groundwater samples will be collected in accordance with the procedures outlined in Section 6.1.1.5 and Attachment 5 of the SAP. Low-flow groundwater sampling methodology outlined in Attachment 5 of the SAP may be used as deemed necessary by the IT Site Manager.

Sample documentation and COC will be recorded as specified in Section 6.0 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are discussed in Section 4.0 and listed in Table 4-1 of the QAP (IT, 2002a). The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.3 Decontamination Requirements

Decontamination will be performed on sampling and non-sampling equipment to prevent cross-contamination between sampling locations. Decontamination of sampling equipment will be performed in accordance with the requirements presented in Section 6.5.1.1 of the SAP (IT, 2002a). Decontamination of non-sampling equipment will be performed in accordance with the requirements presented in Section 6.5.1.2 of the SAP.

4.4 Surveying of Sample Locations

Sampling locations will be marked with pin flags, stakes, and/or flagging and will be surveyed using either global positioning system (GPS) or conventional civil survey techniques, as necessary to obtain the required level of accuracy. Horizontal coordinates will be referenced to

Table 4-3

Groundwater Sample Designations and QA/QC Sample Quantities
Range, Choccolocco Corridor, Parcel 143Q
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Matrix [a]	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-143Q-MW01	HR-143Q-MW01-GW-QH3001-REG	Groundwater				TAL Metals, Nitroaromatic/Nitramine Explosives
HR-143Q-MW02	HR-143Q-MW02-GW-QH3002-REG	Groundwater	HR-143Q-MW02-GW-QH3003-FD		HR-143Q-MW02-GW-QH3002-MS/MSD	TAL Metals, Nitroaromatic/Nitramine Explosives TCL VOCs, TCL SVOCs, Cl Pesticides, OP Pesticides, and Cl Herbicides

[a] Groundwater samples will be collected from the approximate top 5 to 10 feet of water column per Attachment 5 of the SAP (IT, 2002a).

FD - Field duplicate.
Cl - Chlorinated.
FS - Field split.
MS/MSD - Matrix spike/matrix spike duplicate.
OP - Organophosphate.
QA/QC - Quality assurance/quality control.
REG - Field sample.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
VOC - Volatile organic compound.

the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum of 1983. Elevations will be referenced to the North American Vertical Datum of 1988.

Horizontal coordinates for soil sample locations will be recorded using a GPS to provide accuracy within 1 meter. Because of the need to use permanent monitoring wells to determine water levels, a higher level of accuracy is required. Monitoring wells will be surveyed to an accuracy of 0.1 foot for horizontal coordinates and 0.01 foot for elevations, using survey-grade GPS techniques and/or conventional civil survey techniques, as required. Procedures to be used for GPS surveying are described in Section 4.4.1.1 of the SAP. Conventional land survey requirements are presented in Section 4.4.1.2 of the SAP.

4.5 Analytical Program

Samples collected at locations specified in this chapter of this SFSP will be analyzed for specific suites of chemicals and elements based on the history of site usage, as well as EPA, ADEM, FTMC, and USACE requirements. Target analyses for samples collected from Parcel 143Q, consist of the following list of analytical suites:

- Target analyte metals - Method 6010B/7000
- Nitroaromatic/nitramine explosives – Method 8330.

Approximately, ten percent of the samples will be analyzed for the following list of analytical suites:

- Target Compound List Volatile Organic Compounds – Method 5035/8260B
- Target Compound List Semivolatile Organic Compounds – Method 8270C
- Chlorinated pesticides - Method 8081A
- Chlorinated herbicides - Method 8151A
- Organophosphorous pesticides - Method 8141A.

The samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Table 4-4 in this SFSP and Section 5.0 of in the QAP. Data will be reported in accordance with definitive data requirements of the USACE Engineer Manual, 200-1-6, Chemical *Quality Assurance For Hazardous, Toxic And Radioactive Waste (HTRW) Projects* (USACE, 1997), and evaluated by the stipulated requirements for the generation of definitive data (Section 7.2.2 of the QAP). Chemical data will be reported by the laboratory via hard-copy data packages using Contract Laboratory Program-like forms, along with electronic copies.

Table 4-4

Analytical Sample Quantities
Range, Choccolocco Corridor, Parcel 143Q
Fort McClellan, Calhoun County, Alabama

Parameters	Analysis Method	Sample Matrix	TAT Needed	Field Samples			QA/QC Samples[a]					EMAX	QA Lab
				No. of Sample Points	No. of Events	No. of Field Samples	Field Dups (10%)	Splits w/ QA Lab (0%)	MS/MSD (5%)	Trip Blank (1/ship)	Eq. Rinse (1/wk/matrix)	Total No. Analysis	Total No. Analysis
Parcel 143Q: 2 groundwater samples; 11 surface soil samples, and 8 subsurface soil samples.													
All samples will be analyzed for the following parameters:													
TAL Metals	6010B/7000	water	normal	2	1	2	1		1		1	6	0
Nitroaromatic/Nitramine Explosives	8330	water	normal	2	1	2	1		1		1	6	0
TAL Metals	6010B/7000	soil	normal	19	1	19	2		1		2	25	0
Nitroaromatic/Nitramine Explosives	8330	soil	normal	19	1	19	2		1		2	25	0
Approximately10% of the samples will be analyzed for the following parameters:													
TCL VOCs	5035/8260B	Water	normal	1	1	1	1		1	1	1	6	0
TCL SVOCs	8270C	Water	normal	1	1	1	1		1		1	5	0
CI Pesticides	8081A	Water	normal	1	1	1	1		1		1	5	0
OP Pesticides	8141A	Water	normal	1	1	1	1		1		1	5	0
CI Herbicides	8151A	Water	normal	1	1	1	1		1		1	5	0
TCL VOCs	5035/8260B	soil	normal	2	1	2	1		1		1	6	0
TCL SVOCs	8270C	soil	normal	2	1	2	1		1		1	6	0
CI Pesticides	8081A	soil	normal	2	1	2	1		1		1	6	0
OP Pesticides	8141A	soil	normal	2	1	2	1		1		1	6	0
CI Herbicides	8151A	soil	normal	2	1	2	1		1		1	6	0
			Parcel 143Q Totals:			**57**	**16**	**0**	**14**	**1**	**16**	**118**	**0**

[a]Field duplicate, QA split, and MS/MSD samples were calculated as a percentage of the field samples collected per site and were rounded to the nearest whole number. Trip blank samples will be collected in association with water matrix samples for VOC analysis only. Assumed four field samples per day to estimate trip blanks. Equipment blanks will be collected once per event whenever sampling equipment is field decontaminated and re-used. They will be repeated weekly for sampling events that are anticipated to last more than 1 week. Assumed 20 field samples will be collected per week to estimate number of equipment blanks.

Ship samples to:
EMAX Laboratories, Inc
1835 205th Street
Torrance, CA 90501
Attn: Elizabeth McIntyre
Tel: 310-618-8889
Fax: 310-618-0818

MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
TAL - Target analyte list.
TOC - Total organic carbon.
ASTM- American Society for Testing and Materials.

TCL - Target compound list.
VOC - Volatile organic compound.
SVOC - Semivolatile organic compound.
CI - Chlorinated.
OP - Organophosphorus.

These packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

4.6 Sample Preservation, Packaging, and Shipping

Sample preservation, packaging, and shipping will follow the procedures specified in Sections 6.1.3 through 6.1.7 of the SAP (IT, 2002a). Completed analysis request/COC records will be secured and included with each shipment of coolers to:

Attn: Sample Receiving/Elizabeth McIntyre
EMAX Laboratories, Inc.
1835 205th Street
Torrance, California 90501
Telephone: (310) 618-8889

4.7 Investigation-Derived Waste Management

Management and disposal of the investigation-derived wastes (IDW) will follow procedures and requirements described in Appendix D of the SAP (IT, 2002a). The IDW expected to be generated at Parcel 143Q will include decontamination fluids, drill cuttings, purge water, and disposable personal protective equipment. Sampling of IDW to obtain analytical results for characterizing the waste for disposal will follow the procedures specified in Section 6.1.1.8 of the SAP.

4.8 Site-Specific Safety and Health

Health and safety requirements for this SI are provided in the SSHP attachment for Parcel 143Q. The SSHP attachment will be used in conjunction with the installation-wide SHP.

5.0 Project Schedule

The project schedule for the SI activities will be provided by the IT Project Manager to the Base Realignment and Closure Cleanup Team.

6.0 References

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IT Corporation (IT), 2002a, ***Draft Revision 3, Installation-Wide Sampling and Analysis Plan, Fort McClellan, Calhoun County, Alabama***, March.

IT Corporation (IT), 2002b, ***Draft Revision 2, Installation-Wide Work Plan, Fort McClellan, Calhoun County, Alabama***, August.

U.S. Army Corps of Engineers (USACE), 1999a, ***Archives Search Report, Maps, Fort McClellan, Anniston, Alabama,*** July.

U.S. Army Corps of Engineers (USACE), 1999b, ***Statement of Work for Task Order CK10, Remedial Investigations(RIs) at the Chemical Warfare Material Sites, RIs at the Fuel/Training Areas, RIs at the Print Plants/Motor Pools, RIs at the Ground Scars/Boiler Plants, RI at Range 24A, Site investigations (SIs) at the Historic Ranges, and a Groundwater Investigation at Rideout Field at Fort McClellan, Alabama,*** June.

U.S. Army Corps of Engineers (USACE), 1997, ***Chemical Quality Assurance For Hazardous, Toxic and Radioactive Waste (HTRW) Projects***, October 10.

U.S. Department of Agriculture (USDA), 1961, ***Soil Survey, Calhoun County, Alabama***, Soil Conservation Service, Series 1958, No. 9, September 1961.

U.S. Environmental Protection Agency (EPA), 2000, ***Guidance for the Data Quality Objectives Process***, EPA 600/R-96/005, August.

U.S. Environmental Protection Agency (EPA), 1990, ***Installation Assessment, Army Closure Program, Fort McClellan, Anniston, Alabama (TS-PIC-89334)***, Environmental Photographic Interpretation Center (EPIC), Environmental Monitoring Systems Laboratory.

ATTACHMENT 1

LIST OF ABBREVIATIONS AND ACRONYMS

List of Abbreviations and Acronyms

2,4-D	2,4-dichlorophenoxyacetic acid
2,4,5-T	2,4,5-trichlorophenoxyacetic acid
2,4,5-TP	silvex
3D	3D International Environmental Group
AB	ambient blank
AbB3	Anniston gravelly clay loam, 2 to 6 percent slopes, severely eroded
AbC3	Anniston gravelly clay loam, 6 to 10 percent slopes, severely eroded
AbD3	Anniston and Allen gravelly clay loams, 10 to 15 percent slopes, eroded
Abs	skin absorption
ABS	dermal absorption factor
AC	hydrogen cyanide
ACAD	AutoCadd
AcB2	Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded
AcC2	Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded
AcD2	Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded
AcE2	Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded
ACGIH	American Conference of Governmental Industrial Hygienists
AdE	Anniston and Allen stony loam, 10 to 25 percent slope
ADEM	Alabama Department of Environmental Management
ADPH	Alabama Department of Public Health
AEC	U.S. Army Environmental Center
AEL	airborne exposure limit
AET	adverse effect threshold
AF	soil-to-skin adherence factor
AHA	ammunition holding area
AL	Alabama
ALAD	-aminolevulinic acid dehydratase
amb.	Amber
amsl	above mean sea level
ANAD	Anniston Army Depot
AOC	area of concern
APEC	areas of potential ecological concern
APT	armor-piercing tracer
AR	analysis request
ARAR	applicable or relevant and appropriate requirement
AREE	area requiring environmental evaluation
ASP	Ammunition Supply Point
ASR	Archives Search Report
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
AT	averaging time
ATSDR	Agency for Toxic Substances and Disease Registry
ATV	all-terrain vehicle
AWARE	Associated Water and Air Resources Engineers, Inc.
AWWSB	Anniston Water Works and Sewer Board
‘B’	Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero)
BCF	blank correction factor; bioconcentration factor
BCT	BRAC Cleanup Team
BERA	baseline ecological risk assessment
BEHP	bis(2-ethylhexyl)phthalate
BFB	bromofluorobenzene
BFE	base flood elevation
BG	Bacillus globigii
bgs	below ground surface
BHC	betahexachlorocyclohexane
BHHRA	baseline human health risk assessment
BIRTC	Branch Immaterial Replacement Training Center
bkg	background
bls	below land surface
BOD	biological oxygen demand
Bp	soil-to-plant biotransfer factors
BRAC	Base Realignment and Closure
Braun	Braun Intertec Corporation
BSAF	biota-to-sediment accumulation factors
BSC	background screening criterion
BTAG	Biological Technical Assistance Group
BTEX	benzene, toluene, ethyl benzene, and xylenes
BTOC	below top of casing
BTV	background threshold value
BW	biological warfare; body weight
BZ	breathing zone; 3-quinuclidinyl benzilate
C	ceiling limit value
Ca	carcinogen
CAB	chemical warfare agent breakdown products
CAMU	corrective action management unit
CBR	chemical, biological and radiological
CCAL	continuing calibration
CCB	continuing calibration blank
CCV	continuing calibration verification
CD	compact disc
CDTF	Chemical Defense Training Facility
CEHNC	U.S. Army Engineering and Support Center, Huntsville
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
CESAS	Corps of Engineers South Atlantic Savannah
CF	conversion factor
CFC	chlorofluorocarbon
CFDP	Center for Domestic Preparedness
CFR	Code of Federal Regulations
CG	carbonyl chloride (phosgene)
CGI	combustible gas indicator
ch	inorganic clays of high plasticity
CHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
CK	cyanogen chloride
cl	inorganic clays of low to medium plasticity
Cl.	chlorinated
CLP	Contract Laboratory Program
cm	centimeter
CN	chloroacetophenone
CNB	chloroacetophenone, benzene, and carbon tetrachloride
CNS	chloroacetophenone, chloropicrin, and chloroform
CO	carbon monoxide
Co-60	cobalt-60
CoA	Code of Alabama
COC	chain of custody; contaminant of concern
COE	Corps of Engineers
Con	skin or eye contact
COPC	chemical(s) of potential concern
COPEC	chemical(s) of potential ecological concern
CPSS	chemicals present in site samples
CQCSM	Contract Quality Control System Manager
CRDL	contract-required detection limit
CRL	certified reporting limit
CRQL	contract-required quantitation limit
CRZ	contamination reduction zone
Cs-137	cesium-137
CS	ortho-chlorobenzylidene-malononitrile
CSEM	conceptual site exposure model
CSM	conceptual site model
CT	central tendency
ctr.	container
CWA	chemical warfare agent
CWM	chemical warfare material; clear, wide mouth
CX	dichloroformoxime
‘D’	duplicate; dilution
D&I	detection and identification
DAF	dilution-attenuation factor
DANC	decontamination agent, non-corrosive
ºC	degrees Celsius
ºF	degrees Fahrenheit
DCE	dichloroethene
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethene
DDT	dichlorodiphenyltrichloroethane
DEH	Directorate of Engineering and Housing
DEP	depositional soil
DFTPP	decafluorotriphenylphosphine
DI	deionized
DID	data item description
DIMP	di-isopropylmethylphosphonate
DM	dry matter
DMBA	dimethylbenz(a)anthracene
DMMP	dimethylmethylphosphonate

DOD	U.S. Department of Defense
DOJ	U.S. Department of Justice
DOT	U.S. Department of Transportation
DP	direct-push
DPDO	Defense Property Disposal Office
DPT	direct-push technology
DQO	data quality objective
DRMO	Defense Reutilization and Marketing Office
DRO	diesel range organics
DS	deep (subsurface) soil
DS2	Decontamination Solution Number 2
DWEL	drinking water equivalent level
E&E	Ecology and Environment, Inc.
EB	equipment blank
EBS	environmental baseline survey
EC_{50}	effects concentration for 50 percent of a population
ECBC	Edgewood Chemical/Biological Command
ED	exposure duration
EDD	electronic data deliverable
EF	exposure frequency
EDQL	ecological data quality level
EE/CA	engineering evaluation and cost analysis
Elev.	elevation
EM	electromagnetic
EMI	Environmental Management Inc.
EM31	Geonics Limited EM31 Terrain Conductivity Meter
EM61	Geonics Limited EM61 High-Resolution Metal Detector
EOD	explosive ordnance disposal
EODT	explosive ordnance disposal team
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
EPIC	Environmental Photographic Interpretation Center
EPRI	Electrical Power Research Institute
ER	equipment rinsate
ERA	ecological risk assessment
ER-L	effects range-low
ER-M	effects range-medium
ESE	Environmental Science and Engineering, Inc.
ESMP	Endangered Species Management Plan
ESN	Environmental Services Network, Inc.
ESV	ecological screening value
ET	exposure time
EU	exposure unit
Exp.	explosives
E-W	east to west
EZ	exclusion zone
FAR	Federal Acquisition Regulations
FB	field blank
FD	field duplicate
FDA	U.S. Food and Drug Administration
FedEx	Federal Express, Inc.
FEMA	Federal Emergency Management Agency
FFCA	Federal Facilities Compliance Act
FFE	field flame expedient
FFS	focused feasibility study
FI	fraction of exposure
Fil	filtered
Flt	filtered
FMDC	Fort McClellan Development Commission
FML	flexible membrane liner
FMP 1300	Former Motor Pool 1300
FOMRA	Former Ordnance Motor Repair Area
Foster Wheeler	Foster Wheeler Environmental Corporation
Frtn	fraction
FS	field split; feasibility study
FSP	field sampling plan
ft	feet
ft/ft	feet per foot
FTA	Fire Training Area
FTMC	Fort McClellan
FTRRA	FTMC Reuse & Redevelopment Authority
g	gram
g/m^3	gram per cubic meter
G-856	Geometrics, Inc. G-856 magnetometer
G-858G	Geometrics, Inc. G-858G magnetic gradiometer
GAF	gastrointestinal absorption factor
gal	gallon
gal/min	gallons per minute
GB	sarin
gc	clay gravels; gravel-sand-clay mixtures
GC	gas chromatograph
GCL	geosynthetic clay liner
GC/MS	gas chromatograph/mass spectrometer
GCR	geosynthetic clay liner
GFAA	graphite furnace atomic absorption
GIS	Geographic Information System
gm	silty gravels; gravel-sand-silt mixtures
gp	poorly graded gravels; gravel-sand mixtures
gpm	gallons per minute
GPR	ground-penetrating radar
GPS	global positioning system
GS	ground scar
GSA	General Services Administration; Geologic Survey of Alabama
GSBP	Ground Scar Boiler Plant
GSSI	Geophysical Survey Systems, Inc.
GST	ground stain
GW	groundwater
gw	well-graded gravels; gravel-sand mixtures
HA	hand auger
HCl	hydrochloric acid
HD	distilled mustard
HDPE	high-density polyethylene
HEAST	Health Effects Assessment Summary Tables
Herb.	herbicides
HHRA	human health risk assessment
HI	hazard index
HPLC	high performance liquid chromatography
HNO_3	nitric acid
HQ	hazard quotient
HQ_{screen}	screening-level hazard quotient
hr	hour
H&S	health and safety
HSA	hollow-stem auger
HTRW	hazardous, toxic, and radioactive waste
'I'	out of control, data rejected due to low recovery
IATA	International Air Transport Authority
ICAL	initial calibration
ICB	initial calibration blank
ICP	inductively-coupled plasma
ICRP	International Commission on Radiological Protection
ICS	interference check sample
ID	inside diameter
IDL	instrument detection limit
IDLH	immediately dangerous to life or health
IDM	investigative-derived media
IDW	investigation-derived waste
IEUBK	Integrated Exposure Uptake Biokinetic
IF	ingestion factor; inhalation factor
ILCR	incremental lifetime cancer risk
IMPA	isopropylmethyl phosphonic acid
IMR	Iron Mountain Road
in.	inch
Ing	ingestion
Inh	inhalation
IP	ionization potential
IPS	International Pipe Standard
IR	ingestion rate
IRDMIS	Installation Restoration Data Management Information System
IRIS	Integrated Risk Information Service
IRP	Installation Restoration Program
IS	internal standard
ISCP	Installation Spill Contingency Plan
IT	IT Corporation
ITEMS	IT Environmental Management System™

'J'	estimated concentration
JeB2	Jefferson gravelly fine sandy loam, 2 to 6 percent slopes, eroded
JeC2	Jefferson gravelly fine sandy loam, 6 to 10 percent slopes, eroded
JfB	Jefferson stony fine sandy loam, 0 to 10 percent slopes have strong slopes
JPA	Joint Powers Authority
K	conductivity
K_{ow}	octonal-water partition coefficient
L	lewisite; liter
l	liter
LBP	lead-based paint
LC	liquid chromatography
LCS	laboratory control sample
LC_{50}	lethal concentration for 50 percent population tested
LD_{50}	lethal dose for 50 percent population tested
LEL	lower explosive limit
LOAEL	lowest-observed-advserse-effects-level
LT	less than the certified reporting limit
LUC	land-use control
LUCAP	land-use control assurance plan
LUCIP	land-use control implementation plan
max	maximum
MB	method blank
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
MCPA	4-chloro-2-methylphenoxyacetic acid
MCS	media cleanup standard
MD	matrix duplicate
MDC	maximum detected concentration
MDCC	maximum detected constituent concentration
MDL	method detection limit
mg	milligrams
mg/kg	milligrams per kilogram
mg/kg/day	milligram per kilogram per day
mg/kgbw/day	milligrams per kilogram of body weight per day
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
mh	inorganic silts, micaceous or diatomaceous fine, sandy or silt soils
MHz	megahertz
µg/g	micrograms per gram
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
µmhos/cm	micromhos per centimeter
min	minimum
MINICAMS	miniature continuous air monitoring system
ml	inorganic silts and very fine sands
mL	milliliter
mm	millimeter
MM	mounded material
MMBtu/hr	million Btu per hour
MOGAS	motor vehicle gasoline
MP	Military Police
MPA	methyl phosphonic acid
MPM	most probable munition
MQL	method quantitation limit
MR	molasses residue
MRL	method reporting limit
MS	matrix spike
mS/cm	millisiemens per centimeter
mS/m	millisiemens per meter
MSD	matrix spike duplicate
MTBE	methyl tertiary butyl ether
msl	mean sea level
MtD3	Montevallo shaly, silty clay loam, 10 to 40 percent slopes , severely eroded
mV	millivolts
MW	monitoring well
MWI&P	Monitoring Well Installation and Management Plan
Na	sodium
NA	not applicable; not available
NAD	North American Datum
NAD83	North American Datum of 1983
NAVD88	North American Vertical Datum of 1988
NAS	National Academy of Sciences
NCEA	National Center for Environmental Assessment
NCP	National Contingency Plan
NCRP	National Council on Radiation Protection and Measurements
ND	not detected
NE	no evidence; northeast
ne	not evaluated
NEW	net explosive weight
NFA	No Further Action
NG	National Guard
NGP	National Guardsperson
ng/L	nanograms per liter
NGVD	National Geodetic Vertical Datum
Ni	nickel
NIC	notice of intended change
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Standards and Technology
NLM	National Library of Medicine
NPDES	National Pollutant Discharge Elimination System
NPW	net present worth
No.	number
NOAA	National Oceanic and Atmospheric Administration
NOAEL	no-observed-adverse-effects-level
NR	not requested; not recorded; no risk
NRC	National Research Council
NRCC	National Research Council of Canada
NRHP	National Register of Historic Places
ns	nanosecond
N-S	north to south
NS	not surveyed
NSA	New South Associates, Inc.
nT	nanotesla
nT/m	nanoteslas per meter
NTU	nephelometric turbidity unit
nv	not validated
O_2	oxygen
O&G	oil and grease
O&M	operation and maintenance
OB/OD	open burning/open detonation
OD	outside diameter
OE	ordnance and explosives
oh	organic clays of medium to high plasticity
ol	organic silts and organic silty clays of low plasticity
OP	organophosphorus
ORP	oxidation-reduction potential
OSHA	Occupational Safety and Health Administration
OSWER	Office of Solid Waste and Emergency Response
OVM-PID/FID	organic vapor meter-photoionization detector/flame ionization detector
OWS	oil/water separator
oz	ounce
PA	preliminary assessment
PAH	polynuclear aromatic hydrocarbon
PARCCS	precision, accuracy, representativeness, comparability, completeness, and sensitivity
Parsons	Parsons Engineering Science, Inc.
Pb	lead
PBMS	performance-based measurement system
PC	permeability coefficient
PCB	polychlorinated biphenyl
PCDD	polychlorinated dibenzo-p-dioxins
PCDF	polychlorinated dibenzofurans
PCE	perchloroethene
PCP	pentachlorophenol
PDS	Personnel Decontamination Station
PEF	particulate emission factor
PEL	permissible exposure limit
PES	potential explosive site
Pest.	pesticides
PETN	pentarey thritol tetranitrate
PFT	portable flamethrower
PG	professional geologist
PID	photoionization detector
PkA	Philo and Stendal soils local alluvium, 0 to 2 percent slopes

List of Abbreviations and Acronyms *(Continued)*

PM	project manager
POC	point of contact
POL	petroleum, oils, and lubricants
POW	prisoner of war
PP	peristaltic pump; Proposed Plan
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
PPMP	Print Plant Motor Pool
ppt	parts per thousand
PR	potential risk
PRA	preliminary risk assessment
PRG	preliminary remediation goal
PSSC	potential site-specific chemical
pt	peat or other highly organic silts
PVC	polyvinyl chloride
QA	quality assurance
QA/QC	quality assurance/quality control
QAM	quality assurance manual
QAO	quality assurance officer
QAP	installation-wide quality assurance plan
QC	quality control
QST	QST Environmental, Inc.
qty	quantity
Qual	qualifier
'R'	rejected data; resample
R&A	relevant and appropriate
RA	remedial action
RAO	removal action objective
RBC	risk-based concentration
RCRA	Resource Conservation and Recovery Act
RD	remedial design
RDX	cyclonite
ReB3	Rarden silty clay loams
REG	regular field sample
REL	recommended exposure limit
RFA	request for analysis
RfC	reference concentration
RfD	reference dose
RGO	remedial goal option
RI	remedial investigation
RL	reporting limit
RME	reasonable maximum exposure
ROD	Record of Decision
RPD	relative percent difference
RRF	relative response factor
RSD	relative standard deviation
RTC	Recruiting Training Center
RTECS	Registry of Toxic Effects of Chemical Substances
RTK	real-time kinematic
SA	exposed skin surface area
SAD	South Atlantic Division
SAE	Society of Automotive Engineers
SAIC	Science Applications International Corporation
SAP	installation-wide sampling and analysis plan
sc	clayey sands; sand-clay mixtures
Sch.	Schedule
SCM	site conceptual model
SD	sediment
SDG	sample delivery group
SDZ	safe distance zone; surface danger zone
SEMS	Southern Environmental Management & Specialties, Inc.
SF	cancer slope factor
SFSP	site-specific field sampling plan
SGF	standard grade fuels
SHP	installation-wide safety and health plan
SI	site investigation
SINA	Special Interest Natural Area
SL	standing liquid
SLERA	screening-level ecological risk assessment
sm	silty sands; sand-silt mixtures
SM	Serratia marcescens
SMDP	Scientific Management Decision Point
s/n	signal-to-noise ratio
SOP	standard operating procedure
SOPQAM	U.S. EPA's *Standard Operating Procedure/Quality Assurance Manual*
sp	poorly graded sands; gravelly sands
SP	submersible pump
SPCC	system performance calibration compound
SPCS	State Plane Coordinate System
SPM	sample planning module
SQRT	screening quick reference tables
Sr-90	strontium-90
SRA	streamlined human health risk assessment
SRM	standard reference material
Ss	stony rough land, sandstone series
SS	surface soil
SSC	site-specific chemical
SSHO	site safety and health officer
SSHP	site-specific safety and health plan
SSL	soil screening level
SSSL	site-specific screening level
SSSSL	site-specific soil screening level
STB	supertropical bleach
STC	source-term concentration
STD	standard deviation
STEL	short-term exposure limit
STL	Severn-Trent Laboratories
STOLS	Surface Towed Ordnance Locator System®
Std. units	standard units
SU	standard unit
SUXOS	senior UXO supervisor
SVOC	semivolatile organic compound
SW	surface water
SW-846	U.S. EPA's *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*
SWMU	solid waste management unit
SWPP	storm water pollution prevention plan
SZ	support zone
TAL	target analyte list
TAT	turn around time
TB	trip blank
TBC	to be considered
TCA	trichloroethane
TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TCDF	tetrachlorodibenzofurans
TCE	trichloroethene
TCL	target compound list
TCLP	toxicity characteristic leaching procedure
TDEC	Tennessee Department of Environment and Conservation
TDGCL	thiodiglycol
TDGCLA	thiodiglycol chloroacetic acid
TERC	Total Environmental Restoration Contract
THI	target hazard index
TIC	tentatively identified compound
TLV	threshold limit value
TN	Tennessee
TNT	trinitrotoluene
TOC	top of casing; total organic carbon
TPH	total petroleum hydrocarbons
TR	target cancer risk
TRADOC	U.S. Army Training and Doctrine Command
TRPH	total recoverable petroleum hydrocarbons
TSCA	Toxic Substances Control Act
TSDF	treatment, storage, and disposal facility
TWA	time-weighted average
UCL	upper confidence limit
UCR	upper certified range
'U'	not detected above reporting limit
UF	uncertainty factor
USACE	U.S. Army Corps of Engineers
USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
USAEC	U.S. Army Environmental Center
USAEHA	U.S. Army Environmental Hygiene Agency
USACMLS	U.S. Army Chemical School

USAMPS	U.S. Army Military Police School
USATCES	U.S. Army Technical Center for Explosive Safety
USATEU	U.S. Army Technical Escort Unit
USATHAMA	U.S. Army Toxic and Hazardous Material Agency
USC	United States Code
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
UTL	upper tolerance level; upper tolerance limit
UXO	unexploded ordnance
UXOQCS	UXO Quality Control Supervisor
UXOSO	UXO safety officer
V	vanadium
VOA	volatile organic analyte
VOC	volatile organic compound
VOH	volatile organic hydrocarbon
VQlfr	validation qualifier
VQual	validation qualifier
VX	nerve agent (O-ethyl-S-[diisopropylaminoethyl]-methylphosphonothiolate)
WAC	Women's Army Corps
Weston	Roy F. Weston, Inc.
WP	installation-wide work plan
WRS	Wilcoxon rank sum
WS	watershed
WSA	Watershed Screening Assessment
WWI	World War I
WWII	World War II
XRF	x-ray fluorescence
yd^3	cubic yards

SAIC – Data Qualifiers, Codes and Footnotes, 1995 Remedial Investigation

N/A – Not analyzed

ND – Not detected

Boolean Codes

LT – Less than the certified reporting limit

Flagging Codes

9 – Non-demonstrated/validated method performed for USAEC

B – Analyte found in the method blank or QC blank

C – Analysis was confirmed

D – Duplicate analysis

I – Interfaces in sample make quantitation and/or identification to be suspicious

J – Value is estimated

K – Reported results are affected by interfaces or high background

N – Tentatively identified compound (match greater than 70%)

Q – Sample interference obscured peak of interest

R – Non-target compound analyzed for but not detected (GC/MS methods)

S – Non-target compound analyzed for and detected (GC/MS methods)

T – Non-target compound analyzed for but not detected (non GC/MS methods)

U – Analysis in unconfirmed

Z – Non-target compound analyzed for and detected (non-GC/MS methods)

Qualifiers

J – The low-spike recovery is low

N – The high-spike recovery is low

R – Data is rejected